The Construction of Big Data Platform System of a Smart Tourism

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Abstract: In recent years, the development of China's tourism industry is booming. Along with the popularization of information technology, tourism has entered the era of smart tourism. Information is the guarantee of tourism quality. However, the traditional tourism service information sharing is not sufficient, there are many security problems, and there is no standardization system. A big data platform system of smart tourism is proposed for this background, the performance evaluation of the data platform is analyzed, and the operability and effectiveness of the platform system is verified.

Keywords: Smart tourism; Big data platform; System construction

1. Introduction

Traditional tourism information is provided through various tourism agencies. For example, choosing guides, consulting sites, and other service information requires visitors to make inquiries. Travel information is relatively independent and non-integrated. Therefore, the information is provided in different ways. With the continuous development of science and technology, smart tourism emerged with the aid of science and technology to achieve the connection and information sharing of various independent information providing platforms, which not only facilitates travelers to plan trips, but also facilitates management departments to collect statistics on tourist data. Therefore, a smart travel big data platform system is proposed, its hardware and software parts are designed, and the operability of the system is proved through experiments.

2. Building a Smart Tourism Big Data Platform System

2.1. Smart Tourism Platform Hardware Design

The service objects of the smart tourism system include tourists, tourist areas, scenic spot management departments, and tourism related companies. The construction system uses the big data technology. With the continuous development of the information society, the data is growing rapidly. The big data platform is the carrier of massive data. The core mission of the big data platform is to handle, process and apply tourism data to achieve multiple types of personalized services.

The construction of the smart tourism big data platform follows certain principles. One is for tourists and meets needs; the other is government guidance and service enterprises; three are for resource integration and social participation; and four are focused and gradually advanced [1]. The functional design of the smart travel big data platform includes the following four aspects:
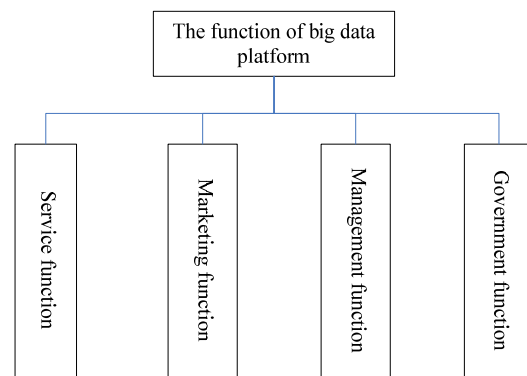

Figure 1. The functional analysis of smart tourism big data platform

The key to the smart tourism big data platform: Online access to travel information and services; Tourist attractions marketing; e-commerce transactions; tourism supervision and management; cooperation of tourism management departments. The tourism information database is the foundation of the smart tourism big data platform. The data information determines the quality of the application system, and the data information supports the operation of the smart tourism platform.

2.2. Smart Tourism Platform System Software Design

The main applications of the smart tourism big data platform include: location services, intelligent information services, and additional services. The Smart tourism big data platform system consists of five parts, as shown in the following figure:
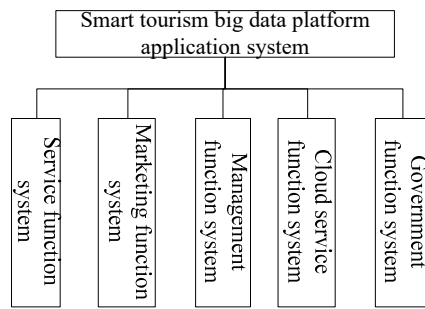
Figure 2. Big data platform application system module composition

2.2.1. Smart service function design

The smart service function includes three major sections: user management, online management of travel cards and tourism information services. In order to guarantee tourists' high-quality experience and high-quality service for tour guides, functions such as authentication, user management, information consultation and trip planning will be implemented. The security of user information is a prerequisite for the stable operation of the platform. The user submits a registration application and the administrator approves or rejects the review. Communication between users provide sufficient momentum for the continued development of the platform. The function of the member management and maintenance part is to maintain user information and understand the user's login frequency, which is of great significance to the continuous and stable operation of the big data platform. Online management functions include network management of bank cards, authentication, electronic payment, etc. Online management is mainly performed for three modules: travel card online application, consumer inquiry and service management. The platform sends a request to the household register management database and configures an identity tag for it. The user can use the online consumption function after request. In addition, the online management system also provides users with efficient transactions such as transactions between bank cards and scenic area traffic monitoring. While paying attention to food, housing, transportation and entertainment, tourists are more concerned about the local culture and customs of the site. The design of tourism information services should not only include local characteristics, but also focus on practicality. The key to the creation of the information query part is to use advanced technology to integrate local tourism official websites and forums to achieve the goal of information sharing. This will avoid the duplication of information and dispersion, but also easy to manage, to a large extent convenient for visitors to query. The tourism information service module also includes local food, accommodation, transportation, shopping and other aspects of the query, the system au-

tomatically classifies it, visitors only need to sort and query [2]. The smart service function brings great convenience to tourists' travel and play. The guide can also find other evaluation information through the smart tourism big data platform.

2.2.2. Smart marketing function design

The smart marketing function system is mainly used to display the image of the attractions and to conduct publicity, to display the promotion activities of the attractions, and to display and promote the tourism products of the attractions. Through the platform, visitors can feel immersive and achieve the purpose of marketing. The big data system that supports local companies provides hotel reservation services for local hotels. It can register and accept customers' applications online. The platform also supports visitors' check-in with spending cards and avoids cumbersome registration procedures at the front desk. Smart tourism big data platform provides online ticket marketing services for local charging attractions, supports visitors to directly enter the scenic spot with the consumption card, and supports online ticket group purchase, and online tickets have preferential policies. The Smart tourism big data platform provides online promotion and online meal ordering services for catering in the tourist areas, supports tourists to order meals online, and provides more professional and humane services for tourists' diets. The smart tourism big data platform provides one-stop online services for travel agencies. Tourists can sign travel contracts and a series of procedures directly through the platform. The Smart tourism big data platform provides a sales platform for merchants in the tourism area, providing integrated services for display, marketing, and settlement, and providing logistics services. The smart marketing system is based on Internet big data and combines virtual reality technology to launch trading activities. The government tourism management department manipulates the interaction of the network and promotes it. The marketing service system consists of six subsystems, as shown in the following Figure.

2.2.3. Smart management function design

The smart management application system can strengthen the supervision of the tourism industry and provide timely basis for the local tourism management department to make decisions. The smart management application system consists of three subsystems: the integrity monitoring subsystem, the public release subsystem, and the information management subsystem. The advantage of this management function system is that it can release timely policies and regulations on tourism, provide tourism strategies for tourists, and credit rating for users and businesses. The user appraisal subsystem provides visitors with an open and convenient interface, accepts visitors' evaluations and complaints on companies, attrac-

tions, etc. It can also seek for opinions from visitors through the platform, and records the integrity of the company. It can make timely adjustments according to the complaints. The public release subsystem is rectified and released according to national tourism regulations, and a complete database is constructed. Classify and store according to categories and user objects to establish an efficient index directory, centralize and manage the news issued by the local tourism management department, and a quick way to search for tourist information is established, thereby increase the number of visitors' traffic.
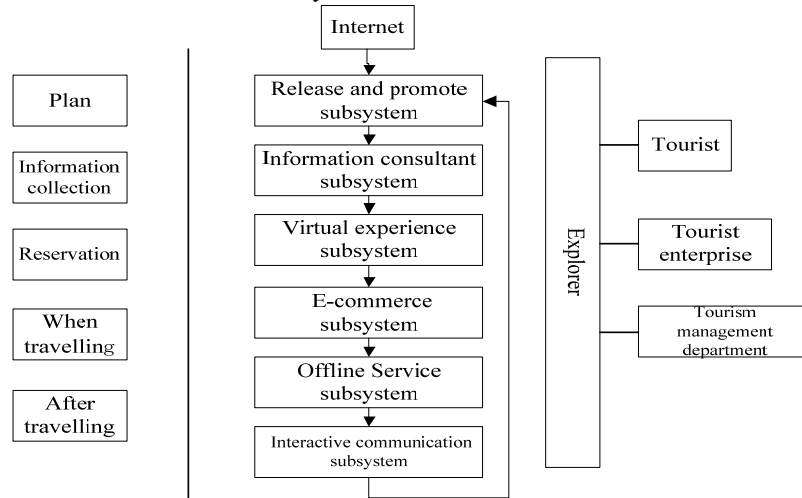

Figure 3. Frame diagram of smart marketing system

2.2.4. Smart government function design

The smart government system is a three-level government platform and an important office platform. The contents of the smart government system include: authority management, document processing, communication connection, and online emergency command. Through the command of the office system, the electronic office of the government agency is realized, simplifying the process and improving the efficiency. The government administration sub-system implements single sign-on design. The management personnel use a set of accounts and passwords to log in multiple information subsystems to realize electronic office work, receive government news, and then forward it to users and websites to provide management support for the data platform[3]. While providing tourist information and planning trips to users, it also transmits relevant tourism-related data to relevant government departments to ensure the maintenance of data and systems. Online emergency subsystems can play command and coordination functions in response to emergencies, and interact with attractions security systems, such as firefighting and medical care.

2.2.5. Smart cloud service function design

The cloud service module of the smart travel data platform provides uniform and unified cloud services for the entire tourism enterprise and tourism related management departments. The foundation of the public service system is cloud services. The system follows the principle of unified standard collection and storage to ensure the au-thenticity, humanization and intelligence of information data to the utmost extent. This system provides a local interface for long-distance data, and also provides a switch port to synchronize and share information with the cloud center. The cloud infrastructure includes computers, networks, storage devices, etc., according to the actual situation in the local area, create a cloud service base, and then select corresponding information data according to the current situation. The cloud application center puts the data platform in the cloud and provides different travel services for different tourists, so that the system service is humanized. The cloud service provides the corresponding tourism-related information services, travel route design and virtual travel experience for the needs of the tourist guides. According to the actual situation, as far as possible, the whole process of tourism is intelligent and humanized, and at the same time, the tour guide test function is realized. The cloud service is aimed at the tourism management department, and prepares corresponding monitoring functions and operational functions for it. Compared with small and medium-sized tourism enterprises, it prepares functions such as intelligent sales and management products [4]

2.2.6. Platform performance evaluation design

To evaluate the performance of the smart tourism big data platform, first create a judgment matrix, and then calculate and analyze the weight of the results. The number is used to indicate the relative importance, the N factors are compared in pairs, and then the judgment matrix

$A = \left(a_{ij} \right)_{m \times n}$ is created according to the structure, while the condition $a_{ij} > 0$、$a_{ij} = 1/a_{ij}$、$a_{ij} = 1$ is satisfied. First, multiply the elements of each row of the matrix to get M_i, $M_i = \sum_{j=1}^{n} a_{ij}, i = 1, 2, ..., n$, the product is subjected to the square processing $w_i = \sqrt[n]{M_i}$, and the obtained

values are integrated to obtain $w_i = \dfrac{w_i}{\sum_{j=1}^{n} w_j}$, and the max-

imum eigenvalue $\lambda_{\max} = \sum_{i=1}^{n} \dfrac{AW_i}{nW}$ is calculated[5].

Then use the SAATY scale method to obtain the performance evaluation index judgment matrix.
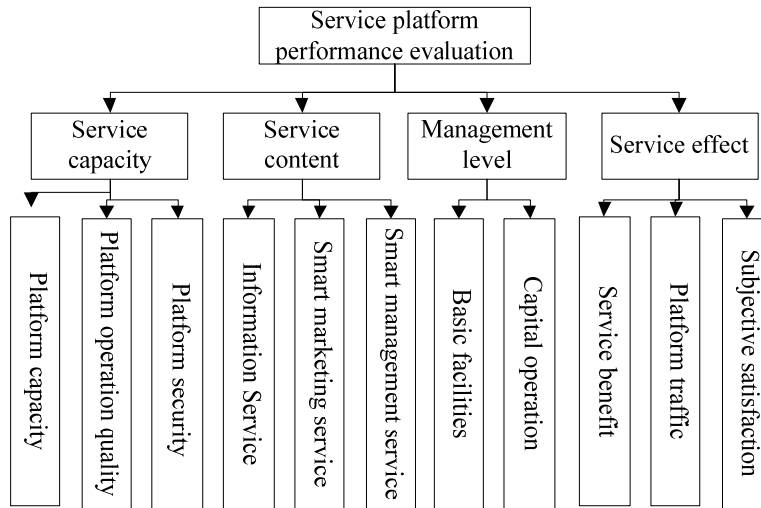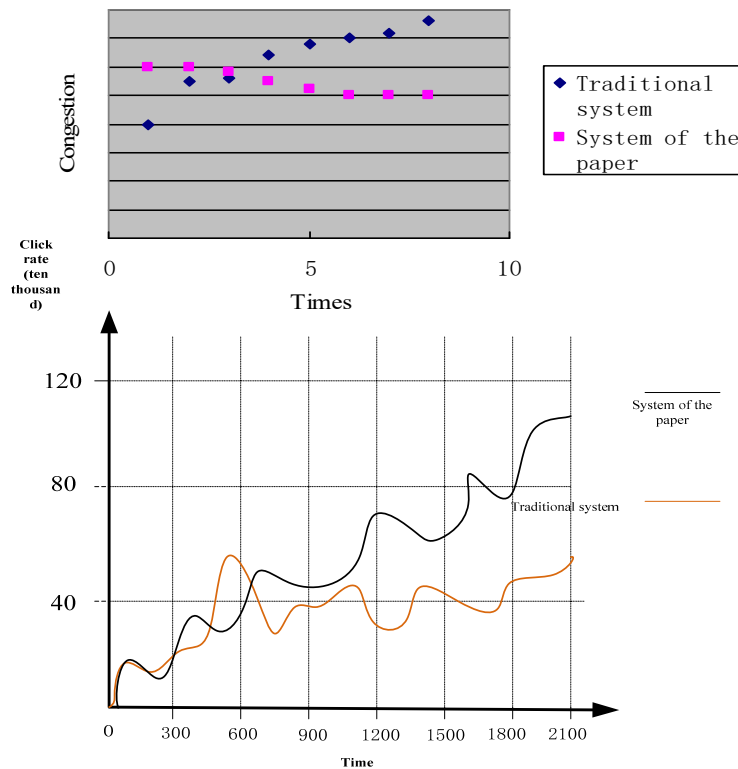

Figure 4. Hierarchical model diagram

Figure 5. Performance comparison results of different systems

3. Case analysis

In order to verify the effectiveness of the smart tourism big data platform system, the performance evaluation of the smart tourism big data platform is taken, and first determine the weight of each indicator, and then comprehensively evaluate it.

3.1. Data preparation

The case is selected in Liaoning Province, and a questionnaire survey is conducted. The decision-making target is the performance evaluation of the smart tourism big data platform in Liaoning Province.

3.2. Result analysis

As can be seen from the above figure, through the big data platform designed in this paper, the government tourism management department can effectively avoid crowds of people. According to the network data information, the areas with a large number of scenic spots and people are diverted, and after setting up the smart tourism big data platform, the click-through rate of the tourist attractions is increasing. Compared with the traditional tourism information system, the system designed in this paper is more effective, more humanized, more intelligent and more specialized.

From the case analysis, the coverage and integrity of the information data and system services of the big data system are in line with local development goals. The big data platform is a window for external display, and visitors are very satisfied with the service. In addition, the platform can evaluate tourism information, which proves the operability of the platform system [6].

4. Conclusion

The smart tourism big data platform is a project with a wide design scope and difficult implementation. It is still in the stage of research and improvement at present. If we want to promote the stable development of the platform, we need to clarify the operational mechanism for platform construction and promotion, increase the propaganda of the platform, and ensure the capital turnover of platform construction and application. Then establish reasonable operational management standards, let us work together to promote the steady development of China's smart tourism platform.

Acknowledgment

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